

WHAT IS CLAIMED IS:

1. A beam inspection apparatus, comprising:
  - a beam source that discharges a beam;
  - a stage system that holds a specimen and moves continuously in at least one direction;
  - a primary optical system that directs the beam to the specimen;
  - a secondary optical system that guides a secondary beam coming from the specimen;
  - a sensor that outputs an electric signal of the specimen image from the secondary beam;
  - an image processor that generates image information of the specimen by processing the electric signal output by the sensor; and
  - a host computer that generates an inspection timing signal for controlling the sensor to transfer the image information at a preset data transfer rate,wherein the stage system is moved at a speed in conformity to the inspection timing signal, and a signal charge of the specimen image converted by the sensor is transferred at an effective data transfer rate of larger than  $2.29 \times 10^7$  Hz/pix and at a line rate of larger than 11175Hz/line.
2. The beam inspection apparatus of claim 1, wherein the primary optical system shapes the beam into an elliptical form.
3. The beam inspection apparatus of claim 1, wherein the primary optical system shapes the beam into a rectangular form.
4. The beam inspection apparatus of claim 1, further comprising a numerical aperture having an opening section arranged to become a focus position of a first lens from the specimen.
5. A beam inspection apparatus for inspecting a specimen comprising:
  - a beam source that discharges a beam;
  - a primary optical system that directs the beam to the specimen;
  - a secondary optical system that guides a secondary beam coming from the specimen;
  - a sensor that outputs an electric signal of the specimen image from the secondary beam;

an image processor that generates image information of the specimen by processing the electric signal output by the sensor;

a stage system that holds the specimen and moves in at least one direction, the stage system having a laser interferometer for reading an x·y position of the stage and a stage controller that drives the stage,

wherein the image information of the specimen generated by the image processor is compensated with regard to a specimen image displacement arising from a speed variation or a mechanical vibration of the stage system.

6. The beam inspection apparatus of claim 5, further comprising a numerical aperture having an opening section arranged to become a focus position of a first lens from the specimen.

7. The beam inspection apparatus of claim 5, wherein the beam is applied perpendicularly to a surface of the specimen.

8. An electron beam inspection apparatus for inspecting a specimen, comprising:  
an electron beam source that discharges an electron beam;  
a primary optical system that directs the electron beam to the specimen;  
a sensor that outputs an electric signal of specimen information from a secondary beam;

an information processor that generates information of the specimen by processing the electric signal output by the sensor;

a stage system that holds the specimen and moves in at least one direction, the stage system having a laser interferometer that reads an x·y position of the stage and a stage controller that drives the stage,

wherein the information of the specimen generated by the processor is compensated with regard to a specimen information displacement arising from a speed variation or a mechanical vibration of the stage system.

9. The electron beam inspection apparatus of claim 8, further comprising a secondary optical system that guides a secondary beam coming from the specimen.

10. A beam inspection apparatus, comprising:  
a beam source that discharges a beam;  
a stage system that holds a specimen and moves continuously in at least one direction;

a primary optical system that directs the beam to the specimen;

a secondary optical system that guides a secondary beam coming from the specimen;

a sensor that outputs an electric signal of the specimen image from the secondary beam;

an image processor that generates image information of the specimen by processing the electric signal output by the sensor; and

a host computer that generates an inspection timing signal for controlling the sensor to transfer the image information at a preset data transfer rate,

wherein the stage system is moved at a speed in conformity to the inspection timing signal.